

**Before the
Federal Communications Commission
Washington, D.C. 20554**

In the Matter of)	
)	
)	
Amendment of Part 101 of the Commission's)	
Rules to Facilitate the Use of Microwave for)	WT Docket No. 10-153
Wireless Backhaul and Other Uses and to)	
Provide Additional Flexibility to Broadcast)	
Auxiliary Service and Operational Fixed)	
Microwave Licensees)	
)	
Petition for Rulemaking filed by Fixed)	RM-11602
Wireless Communications Coalition to)	
Amend Part 101 of the Commission's Rules to)	
Authorize 60 and 80 MHz Channels in Certain)	
Bands for Broadband.)	
To: The Commission		

REPLY COMMENTS OF COMSEARCH

Comsearch hereby submits reply comments on the *Further Notice of Proposed Rulemaking* issued by the Commission on August 9, 2011, in the above-captioned proceeding.¹

I. ANTENNA STANDARDS

EIBASS recommends that credible documentation of antenna performance based on measurement data should be available on request.² To the extent that the existing rule language that requires “a radiation pattern provided or certified by the manufacturer”³ may not state this

¹ Amendment of Part 101 of the Commission's Rules to Facilitate the Use of Microwave for Wireless Backhaul and Other Uses and to Provide Additional Flexibility to Broadcast Auxiliary Service and Operational Fixed Microwave Licensees, *Report and Order, Further Notice of Proposed Rulemaking, and Memorandum Opinion and Order*, FCC 11-120 (rel. Aug. 9, 2011) (“FNPRM”).

² EIBASS Comments to Further Notice of Proposed Rulemaking, WT Docket No. 10-153, September 9, 2011, at 5 ¶15.

³ See 47 C.F.R. §101.103(d)(2)(ii).

requirement plainly enough, Comsearch agrees that the Commission should provide suitable guidance or clarification.

Comsearch urged the Commission to correct the language of Section 101.115(f) so that the rule would require the licensee of a Category B antenna predicted to be a source of interference to either upgrade the antenna to Category A or reduce the EIRP below the authorized EIRP (*not the maximum EIRP allowed by rule*).⁴ We disagree with the additional changes to Section 101.115(f) proposed by Wireless Strategies Inc. (WSI).⁵ The WSI language would allow an upgrade path where a licensee would be permitted to substitute a “higher” performance antenna rather than an antenna meeting at least Category A. This change inappropriately reduces the obligation attached to the choice to use a Category B antenna and limits the benefit of a required upgrade.

We are also opposed to WSI’s proposal to extend Section 101.115(f) to cover the 6 GHz bands. Section 101.115(f) was added to allow users of small 11 GHz antennas the option of reducing transmitter power and thus overall EIRP to resolve interference into another user, as an alternative to the primary option of upgrading to a Category A antenna. However, based on recent coordination activity, WSI apparently understands the rule to allow users to coordinate “Category B” antennas and then claim to form a null in the pattern towards other stations to resolve interference. For point-to-point service, antennas should be designed and configured to direct as much of the transmitter power as possible towards the other end of the link, and as little power as possible in other directions. In contrast, WSI apparently seeks to direct as much power as it can in all directions and only reduce EIRP towards stations where there is a specific conflict

⁴ Comments of Comsearch, WT Docket No. 10-153, October 4, 2011 (“Comsearch Initial Comments”), at 4-5.

⁵ Reply Comments of Wireless Strategies Inc., WT Docket No. 10-153, October 4, 2011, at page 2.

reported. This difference in understanding as to the application of Section 101.115(f) is one of the causes of the controversy in prior proceedings in this docket over WSI's plans. The FCC should not extend the controversy to the most important microwave bands at 6 GHz.

II. EFFICIENCY STANDARDS

The Fixed Wireless Communications Coalition ("FWCC") proposes bits-per-second-per-Hertz efficiency standards based on Industry Canada limits.⁶ Comsearch agrees that the standards are reasonable and suggests that, in line with FWCC's recommendation, existing Section 101.141(a)(3) could be replaced with:

"The payload capacity of equipment applied for, authorized, and placed in service after [insert effective date of rules] shall meet the following minimum efficiency standards:

Frequency	Emission Bandwidth ≤ 5 MHz	Emission Bandwidth > 5 MHz
3,700 – 10,550 MHz	2.4 b/s/Hz	4.4 b/s/Hz
10,550 – 13,150 MHz	2.4 b/s/Hz	3.0 b/s/Hz

Traffic loading payload shall exceed 50 percent of payload capacity within 30 months of licensing."

Comsearch argued that adaptive modulation and smaller antennas would relieve excessive cost and other difficulties of rural links so that additional changes to the efficiency standards are unnecessary.⁷ FWCC recommends requiring rural links to meet the minimum payload capacity while forbearing from applying the minimum traffic loading percentage.⁸ FWCC also recommends that links should be defined as rural based on population density.⁹ While we are skeptical that a population-based metric can adequately identify a microwave site

⁶ Comments of the Fixed Wireless Communications Coalition, WT Docket No. 10-153, October 4, 2011 ("FWCC Initial Comments"), at 8-9.

⁷ Comsearch Initial Comments at 7-8.

⁸ FWCC Initial Comments at 6.

⁹ *Id.*

as rural and thus non-congested, we agree that relaxing the traffic loading percentage requirement would be the right course as opposed to relaxing the payload capacity requirement.

III. ALLOWING WIDER CHANNELS

In our comments to the FNPRM, Comsearch expressed concern about whether wider 6 and 11 GHz channels would increase the difficulty of frequency coordination as a result of loss of cross-polarization advantage in aggregate over the long term.¹⁰ We also shared the FCC's concern over whether the wider channels would always be used efficiently. Nevertheless, in light of the cost savings associated with wider channels, we concur that the FCC should proceed to authorize wider 6 and 11 GHz channels subject to appropriate safeguards.

Clearwire supports the proposed rules for wider channels at 6 and 11 GHz and also suggests making allowance for similar channel aggregations in the 18 and 23 GHz bands.¹¹ We note that our concern over loss of cross-polarization applies primarily at 6 GHz and to a lesser degree at 11 GHz; this concern, however, does not apply at 18 and 23 GHz. We agree that aggregating 18 and 23 GHz channels as Clearwire suggests appears viable but should be subject to efficiency standards that are significantly more stringent than the present 1 bps/Hz requirement in these bands.

IV. GEOSTATIONARY ORBIT INTERSECTIONS

In our October 25, 2010 initial comments to the NPRM in this proceeding, Comsearch recommended the changes proposed in the FNPRM in order to harmonize the FCC rule on

¹⁰ Comsearch Initial Comments at 9-10.

¹¹ Comments of Clearwire Corporation to Further Notice of Proposed Rulemaking, WT Docket No. 10-153, October 4, 2011, at 8-9.

geostationary orbit intersections with the ITU Radio Regulations and to increase the efficiency of the application process for Part 101 licenses by eliminating unnecessary waiver filings.¹²

Sirius XM objects to the proposed changes out of concern for interference to receivers aboard its satellites providing DARS service to the United States.¹³ While Sirius XM understandably wants to protect its authorized reception of the 7025-7075 MHz segment, and particularly its service uplinks, we wish to provide evidence that the proposed changes to Section 101.145 would not result in harmful interference to Sirius XM. By extension, this evidence also supports our claim that satellites serving the US should not be adversely affected by the changes.

Sirius XM provides service via geostationary satellites positioned at the 85° West longitude and 115° West longitude positions. The elevation look angle contours to these positions are plotted in Figures 1 and 2, attached as an appendix. For the main beam of a microwave antenna in the CONUS to be directed towards either of Sirius XM's satellite positions, the microwave antenna would have to be using a large elevation angle – at least 20 degrees. Virtually all visible US land areas would require an elevation angle greater than 5 degrees to 115° West, while only Alaska has elevation angles between 0 and 5 degrees to 85° West. But instances where microwave antennas use elevation angles greater than several degrees are quite rare below 10 GHz. The combination of typical lengthy paths and being limited as a practical matter to relatively low antenna heights above sea level make elevation angles near zero degrees the norm. For example, in our October 25, 2010 filing we submitted the microwave antenna elevation angle distribution for the 5,925-6,425 MHz and 6,525-6,875 MHz bands as a plot of the data in Table 1 below, which shows that 97 percent of the antennas are oriented with the main beam 2 degrees above horizontal or lower.

¹² Comments of Comsearch, WT Docket Nos. 10-153, 09-106, 07-12, October 25, 2010, at 29-34.

¹³ Comments of Sirius XM Inc., WT Docket No. 10-153, October 4, 2011, at 2-5.

Elevation Angle (degrees)	Number of Antennas
< -10	270
-10 to -9	30
-9 to -8	60
-8 to -7	81
-7 to -6	90
-6 to -5	137
-5 to -4	249
-4 to -3	463
-3 to -2	1124
-2 to -1	3611
-1 to 0	44288
0 to 1	17198
1 to 2	2590
2 to 3	946
3 to 4	403
4 to 5	241
5 to 6	127
6 to 7	92
7 to 8	77
8 to 9	60
9 to 10	29
> 10	270
Total	72436

Table 1: Distribution of FS Antenna Elevation Angles for the 5,925-6,425 MHz and 6,525-6,875 MHz Bands (Comsearch data, September, 2010)

Any Part 101 usage of the 6,875-7,125 MHz band (the 7,025-7,075 MHz segment of which is used by Sirius XM) should be expected to follow a similar distribution of antenna elevation angles. An interference exposure to a Sirius XM satellite from the main beam of a microwave antenna therefore requires either (1) that the microwave antenna uses a rare high elevation angle on the particular azimuth or (2) that the link is located in Alaska with its lower population density and thus lower density of microwave links.

Nevertheless, in the rare event where a US microwave antenna beam may be directed towards a Sirius XM satellite, the low EIRP required by the proposed rule will protect the

receiver(s) aboard the satellite from harmful interference. Based on the Sirius XM DARS uplink budget on file with the FCC, a 20 MHz digital microwave transmitter (representing typical expected usage in the band) meeting the 35 dBW EIRP limit of the proposed rule would cause interference at least 24 dB below the thermal noise of the satellite receiver(s), as shown in Table 2 below. Furthermore, since each exposure would require a confluence of rare conditions (that the microwave antenna uses a high elevation angle or is located in Alaska, that the microwave antenna is directed towards the satellite, that the microwave transmitter is co-channel with the satellite receiver), we do not expect a significant buildup of interference due to multiple exposures.

Earth Station Transmit EIRP (dBW) ¹⁴	75.0
C/N ₀ thermal up (dBHz) ¹⁵	88.7
FS Transmitter EIRP (dBW) ¹⁶	35.0
I/N ₀ (dBHz)	48.7
FS Transmitter Bandwidth (digital) (MHz)	20.0
I₀/N₀ (dB)	-24.3

Table 2: Ratio of Typical Fixed-Service Interference Power Density to Thermal Noise Power Density at Sirius XM Satellite Receiver

The ITU Radio Regulations recognize there is an EIRP limit below which FS transmitters should not be able to degrade the performance of satellite transponders and thus there is no need to restrict the aiming of antennas below this limit. The proposed rules that bring the FCC rules into agreement with ITU Radio Regulations are a reasonable means to regulate this situation of co-primary sharing.

¹⁴ See IBFS File No. SAT-MOD-20040212-00017, Narrative Attachment page 17, Table A-5: Digital Audio Link Budget.

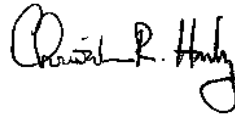
¹⁵ Ibid.

¹⁶ See Proposed Rules at §101.145(b).

CONCLUSION

For the foregoing reasons, Comsearch encourages the Commission to take action in this proceeding consistent with the recommendations set out above.

Respectfully submitted,

A handwritten signature in black ink, appearing to read "Christopher R. Hardy". The signature is written in a cursive, flowing style.

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October 25, 2011

APPENDIX



Figure 1: Elevation Look Angle Contours to 85° West Longitude Orbital Position



Figure 2: Elevation Look Angle Contours to 115° West Longitude Orbital Position